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HOW INNOVATION DISTRICTS (DO NOT) WORK: THE CASE STUDY OF CRACOW

Abstract. This article is an attempt to answer the question: how one selects a neighbourhood to develop an innovation district, using the case of Cracow. This article mainly refers to the issue of the shape of innovation districts, showing how much the morphology of such spaces and their functions can promote or limit the development of innovative enterprises from the Information and Communication Technologies (ICT) industry. It also refers to our research carried out with quantitative and qualitative methods in Poland, using two locations in Cracow as a case study. In this paper, we focus on the significant restrictions which hinder the emergence and development of such districts. We also indicate the potential solutions to these difficulties such as the temporary spaces of events we mapped and which we called 'totemic spaces'.
Key words: innovation district, ICT, cluster.

1. INTRODUCTION: NEIGHBOURHOODS VERSUS INNOVATION FORTRESSES

In the literature in the field of geography, urban studies and social sciences, there are many concepts emphasising the impact of innovation on the social and spatial environment in which this activity is carried out while appreciating the impor-

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tance of closeness and interpersonal interactions for the processes of inventiveness. One of the latest concepts of this type has been the 'innovation district' (Katz and Wagner, 2014). In general, this concept can be characterised by comparing it to 'innovation fortresses'. For decades, there was a tendency to locate R&D departments of enterprises outside city centres in closed areas, to which the staff commuted from other districts. In such areas, work was carried out within a specified time frame, in physical isolation, and within a closed social environment.

The reverse trend has emerged relatively recently, consisting of locating the headquarters of innovative companies in city centres, not only near the homes of employees, but also the headquarters of other enterprises, often with a similar profile. According to this alternative logic, inventiveness is a deeply social process and as such it can be stimulated by the incidental frequent interaction of actors representing different areas of competence and knowledge, and innovation requires highly diverse resources and the support of specialised complementary entities (Storper and Venables, 2004).

As assumed by their designers, innovation districts were supposed to promote the concentration of the interactions of diverse actors and combining resources by appropriate planning of the space itself and its functionality. They were supposed to be multifunctional (an employee was not only supposed to work there, but also to satisfy most of their and their families' needs) and encourage walking, but also to be well connected with the rest of the city. They were supposed to be spaces attracting not only mature enterprises, but also start-ups and various business environment institutions. At the same time, they have been seen as a method for revitalising decayed districts and, in some cases, have been a catalyst for gentrification processes (Morrison and Bevilacqua, 2019; Mirabal, 2009).

However, it is difficult to say how many districts of this kind have been created in the world since the concept was popularised. This is due to the extraordinary diversity of places that are considered, or which their creators would like to call as innovation districts. Social science and technology parks, campuses for start-ups founded by corporations, coworking spaces and start-up hubs run by their managers within them, districts designed by urban planners, commercial developers' projects, declining neighbourhoods gentrified by the creative class... All of these are sometimes referred to as innovation districts. Although the mechanisms for stimulating creativity and innovation seem similar everywhere, the differences between these places are too clear to attempt to treat them as the manifestations of the same phenomenon.

It cannot be ruled out that the innovation district, in one of the mentioned models, is the optimal environment model for innovation. It is also possible that we are witnessing a convergence and all these spaces are changing towards some common pattern. However, does any of these ways of spatial, social and economic organisation of relations among people and enterprises really work? We ask this question from the Polish perspective. In Poland – like in many other countries –various urban initiatives are being developed to stimulate innovation, often narrowly understood as ICT innovation. Poland is an interesting example as the

import of certain ideas about innovation districts has encountered rigid barriers. Several places of this type were created in Poland, but they emerged not without problems, and sometimes they have little in common with such a model of innovation districts as, for example, 22@Barcelona. In our study, we focus on the largest clusters of innovative industries nationwide. However, we illustrate our findings by referring to the case of one city: Cracow. Three types of spatial concentration, one identified in Cracow, have their counterparts in other cities under the study.

The text has been divided into four parts. In the first part, we refer to the spatial aspects of innovation systems and introduce the concept of the innovation district. We embed it in the context of the issue of the effects of spreading knowledge. Based on our experience with looking for and plotting innovation districts in Poland, we distinguish two types of such districts. In the second part, we present the case of Cracow, at the same time pointing to the methodological difficulties related to the designation of innovation districts. Apart from indicating the methodological limitations, we also draw conclusions regarding other impediments that negatively affect the development of innovation districts in Cracow, and generally in Poland. In the third part, we present three types of concentration which can be found in the case of Cracow, referring to their morphology (in the case of physical spaces) and to the characteristics that ideal innovation districts should meet. In the fourth part, i.e. the discussion, we consider the status of the concept of an innovation district: whether it is a useful tool for scientific analysis, an urban policy tool, or maybe an expression of wishful thinking and the belief that the intervention of developers or urban planners, without wider political, economic or cultural changes can unleash new potential from people and enterprises. As a summary, we also formulate preliminary recommendations on what to do to make them work. We are of the underlying opinion that the innovation districts in Poland do not meet the expectations. This does not mean that the concept itself is wrong. This could only be determined by removing the barriers to innovation districts and then implementing imported patterns. However, what can be seen in the example of Cracow still allows one to draw conclusions about the potential of the mechanisms of creation of invention and innovation, on which the creators of innovation districts count.

2. THE CONCENTRATION OF INNOVATIVE BUSINESSES. INNOVATION DISTRICTS AGAINST THE BACKDROP OF OTHER ATTEMPTS TO CONCEPTUALISE THE PHENOMENON

The spatial concentration of enterprises is a phenomenon that geographers have been observing and studying for a long time (Carlino and Kerr, 2015; Micek, 2017). It does not apply only to innovative industries. In the case of nineteenth-century

industry, this concentration was partly dictated by the availability of mineral, labour and water resources. Although the progress of civilisation has provided many entrepreneurs with greater mobility and freedom in locating their headquarters, they are still forming geographical clusters. Detroit (automotive industry) and Silicon Valley (semiconductor industry) are the classic examples of such clusters (Klepper, 2010). The once announced death of the space to which the ICT revolution was to lead has not arrived (see, e.g. Healy and Morgan, 2012; Morgan, 2004; Rodríguez-Pose and Crescenzi, 2008), or at least it has changed little in the functioning of industries. Although in economic geography specialists write more and more often that spatial proximity is not the only form of closeness important for the functioning of enterprises – other important forms of closeness being cultural, cognitive or social closeness – and in theory they should be somewhat substitutable (Boschma, 2005; Crescenzi and Rodríguez-Pose, 2016), we are still observing the concentration of companies, also in the 'dematerialised' industries offering services and software.

It would seem that for entities in the high technology industry, the fact of having solutions enabling remote work and exchange of knowledge, the decisions regarding geographical location would be guided solely by costs, which would eventually lead to dispersion. In practice, however, they are ready to bear several times higher costs in order to operate in the vicinity of other entities from close and complementary industries (Moretti, 2012). What is most important for them seems to be the concentration of knowledge and competence (Florida, 2010). Innovations in the ICT sector on the global level tend to concentrate in the so-called superstar cities which are highly unequal (Glaeser *et al.*, 2009). By attracting affluent firms and their workers, innovation districts can even increase inequalities within a city (Graham and Guy, 2002). By changing the social-economic landscape they can lead not only to gentrification, but also to its biggest threat – displacement (Morrison and Bevilacqua, 2019).

In economic geography there is a strong belief in the relationship between the proximity of enterprises – in particular, but not only, spatial proximity – and their innovation and productivity. This discipline has long been investigating various industry clusters (see, e.g. Cusmano *et al.*, 2014; Delgado *et al.*, 2014; Eriksson, 2011; Howells, 2002; Porter, 2000). However, there is no agreement as to how to measure spatial concentration, how to conceptualise clusters, or to determine why they arise in these locations. Specialist can neither agree as to why, at some point, entities decide to change their locations, which – as a consequence – may lead to a shift in the grouping of entities in a given industry. Finally, there is a discussion about specific mechanisms that make physical proximity conducive to innovation. As Carlino and Kerr (2015, p. 397) noted: "we still have not opened the black box of how clusters operate. Most of our empirical work has instead been comparisons over places. Better empirical guidance about the microinteractions within clusters with respect to innovation will allow us to differentiate among models and build stronger theoretical frameworks".

From our perspective, the key issue applies to the micro-interactions taking place in the small area of an urban district (often not so much in administrative as in morphological and functional terms). The most common explanations of spatial clustering focus on: (1) the benefits of sharing (division of labour, risk sharing, specialised services maintained by a grouping of similar companies) (Saxenian, 1996); (2) a greater adaptability that is created by a denser market (Moretti, 2012); and (3) the effects of *knowledge spillovers* (Audretsch and Feldman, 2004; Breschi and Lissoni, 2001), in particular the tacit knowledge resulting from the density of interaction between people.

Researchers have long been interested in the urban sprawl. Alfred Marshall wrote about it at the end of the 19th century. The subject literature has discussed the benefits of agglomeration (cf. MAR effect) (Glaeser *et al.*, 1992). These include – apart from the availability of human resources, raw materials, suppliers, etc. – the possibility of a knowledge flow. Thanks to geographical proximity, the 'mysteries of the trade' of various companies can operate on the principle of public good – the closeness is a great advantage, enabling the sharing of knowledge, which leads to the dissemination and expansion of knowledge, the use of new ideas that are simply "hanging in the air" surrounding the participants (Marshall, 1920, p. 225). According to Giacomo Becattini, the main critic of Marshall's approach, this effect is not the result of the accidental concentration of entrepreneurs in one place, but rather the earlier character of the district (Becattini, 1990, p. 40). In addition to the benefits of agglomeration, the benefits of urbanisation were indicated (Jacobs, 2016), which result from the diversity of entities: diverse competences and knowledge foster innovation. Diversity is derived from the sheer size of the urban centre. It seems that the effects of urbanisation are more important at the early stages of innovative processes (problem discovery, inventiveness, etc.), while at later stages (refining innovation, implementation, diffusion, scaling) the effects of agglomeration take precedence (Asheim *et al.*, 2013). While innovative and creative firms usually enjoy the benefits of an urban centre and its diversity, morphological and socio-economic changes together with the accompanying gentrification can paradoxically decrease urban heterogeneity.

Unfortunately, it is not clear how to study such processes at a microscale, for example at the scale of a city. A knowledge spillover is not a phenomenon directly perceptible by geographic methods. Attempts have been made to study it by analysing wages (which are assumed to reflect productivity), and patents and their citing (Buzard *et al.*, 2015; Jaffe *et al.*, 1993). However, these approaches have serious limitations. Patents as the indicator of knowledge-making and innovation processes are problematic for many reasons. Not all knowledge is patentable, nor, out of fear of competition, is every discovery patented. Sometimes patents are even used to deceive the competition. Patent activity is geographically and culturally diverse. The implementation value of the vast majority of patents is negligible, and patents in themselves measure inventiveness rather than innovation

(Micek, 2017, pp. 110–111). From our perspective, what seems most important is that patents do not express tacit knowledge, working hypotheses or loose ideas, which in a dynamic and social exchange seems crucial for creating innovative products and services.

The second important problem is that in terms of grouping analyses, there is an disagreement as to how to understand proximity: increasingly, proximity expressed by physical distance or travel time to social distance is being abandoned (Micek, 2017). In addition, researchers do not know to what extent the spread of knowledge occurs: through one office, quarter, district, city, region, the whole country, or maybe a grouping of several countries? Most often, the research is conducted with a focus on innovative companies at the level of regional innovation clusters (Baptista, 2000; Martin and Sunley, 2003), sometimes including cities, but rarely delving into what is happening inside cities. Finally, many concepts were developed in the course of research into the relationship between concentration and innovation: new industrial districts, innovative milieux, a learning region, learning in space, knowledge cities and districts, regional innovation systems (RIS), and clusters (Micek, 2017; Depret and Hamdouch, 2013).

In the context of the Marshall concept cited above, it is worth referring in particular to the *innovative milieu* (Maillat, 1995). It assumed that innovation stimulated by frequent contacts among individuals, also of a personal nature, requires the input of diverse actors, not only entrepreneurs, but also scientists and the representatives of the authorities and the business environment. It puts particular emphasis on the local culture and customs. *Innovative milieu* should be characterised as a spatially located community with a common culture rather than a geographical creation on a specific scale and with clearly defined boundaries. This has hindered its use in the systematic studies of entrepreneurship. This concept has also posed problems considering non-local flows of knowledge and non-spatial forms of intimacy.

The innovation district is another embodiment of the narrative about the relationships among productivity, innovation and geographical space. Contrary to most of the concepts cited, it already communicates the scale by its name and what innovation processes should take place. It also clearly locates them in the urban environment. According to the original formulation, an innovation district is an area where business clusters, start-ups, business incubators and institutional anchors are located (Katz and Wagner, 2014). It is important that those areas are relatively small and multifunctional: residential premises and commercial and social infrastructure should be located next to enterprises, thanks to which they can operate around the clock and meet the majority of the needs of residents/employees and their families. According to the innovation district concept, this would be conducive to the concentration of random interactions between people with potentially complementary knowledge and competences. Many large enterprises try to achieve this type of effect within their structures. An innovation district is about achieving this effect among companies.

An innovation district can be created automatically, forming what we will call a NOID (naturally occurring innovation district). However, they are often the result of the efforts by public and private entities trying to attract specific entities to a given area, often in order to revitalise decaying urban areas. In this case, they should be referred to as planned innovation districts – PIDs (see Spencer, 2015; see also Markusen, 1996).

Not only are scientists interested in such concepts as the *innovative milieu*, the cluster, or the innovation district itself. These ideas also function, and perhaps primarily, as urban policy tools, and sometimes also as narratives on the possible future of selected urban locations or entire cities. And today, not only researchers but also business advisers and political decision-makers (at various levels) are interested in the spatial concentration of ICT entities. Business representatives and politicians see in such ideas as innovation districts the opportunities for urban development and joining the main bunch in the race of entrepreneurial urban centres. Similarly, in Poland we are also dealing with the emergence of various clusters of innovative companies and attempts to create them. Poland has participated in the rush to build science and technology parks and establish clusters. The interest of decision-makers has turned to innovation districts, which – contrary to the 'inventions' mentioned above – are located in central areas, not on the outskirts of cities. Critics emphasise that the 'innovation district' is a concept based more on highly intuitive arrangements and good will than on strong evidence that would explain the role of the urban context in creating innovation. As Edward Glaeser put it: "Innovation districts are … a hypothesis; they're not a proven strategy at this point in time. I think they're as sensible a hypothesis as anyone out there, but they're merely a hypothesis" (Glaeser, 2014).

3. THE METHODOLOGY

Our study was triggered by the need to conduct contextual research, firmly embedded locally and not based on a benchmarking model or a model of best practices. Innovations are 'rooted' and largely unpredictable: they should be treated as part of a politically structured and dynamic process entangled in specific time-space conditions (Hess, 2004). The concept of our study is based on two important elements: (1) analytical concept of the 'social field', and (2) simultaneous focus on the three units of the analysis of an innovation district, company, and employee. The concept of the 'social field' is less common than the network perspective in innovation analysis (Fløysand and Jakobsen, 2010), but it has significant advantages: (1) it integrates cultural, social and territorial aspects into one approach, (2) it is more effective (despite numerous similarities to network analyses) in the

analysis of social practices and in finding tacit knowledge important in the processes of invention and innovation, and (3) it allows one to capture the dynamics of the relationship between structure and the activity characteristic of innovation processes. By using the 'social field' analytical framework, one obtains contextual knowledge about the functioning of entities within fields on three levels: (i) a grouping of innovative enterprises together with the environment (innovation district), (ii) an innovative enterprise, and (iii) individual employees of the innovative industry.

While focussing on the metropolitan nature of the centres, specific cultural and economic contexts, and the development potential of cities (location of new economy companies), we selected five metropolitan areas in Poland, Cracow being just one of them[1]. In this sense, the results of multiple case studies provide a good starting point for theoretical replication (Yin, 2014) as they are reliable and credible (Eilbert and Lafronza, 2005). The organisation of this type of innovation includes 'knowledge-based' entities in the area of high-tech (here, among others, ICT companies producing and operating software, designers of new drugs, and companies with extensive R&D departments) (cf. Spencer, 2015). In addition, the study includes institutional anchors (support/ business environment institutions) operating at the borderline between the private and public sectors (business incubators, hubs, technology parks creating spaces for entrepreneurs). In this article we focus on a case study of Cracow.

4. INNOVATION DISTRICTS IN POLAND

The starting point for a thorough analysis of innovation districts was the selection of NOID and PID type districts in Poland. So, what does the map of innovative enterprises in Poland look like? Within the cities in the first phase of research, we plotted the potential NOIDs and PIDs, and then select case studies for analysis. In the selection, we adopted the criteria formulated by the Project for Public Spaces organisation (Storing and Walker, 2016): (1) the identity of a place, (2) the diversity of companies, (3) the continuity of the place's functioning, and (4) the degree of concentration of companies. The decisive criterion will be the concentration of companies: choosing places based on the largest number of companies located relatively close to each other within the innovative environment in each city.

Data collected from the National Court Register database from the first quarter of 2018 was used to identify the potential innovation districts by mapping

[1] Other research fields were following: Poznań, the Tri-City [Gdańsk, Sopot, Gdynia], Wrocław, and Warsaw.

innovative enterprises in selected cities. It was downloaded via the Application Programming Interface (API) enabling access to public databases made available by MojePaństwo (mojepanstwo.pl). After cleaning the data (among others, duplicates were removed and companies whose registered office's address was located within the city were selected), they was prepared for further analysis. From among the enterprises we selected those whose PKD (Polska Klasyfikacja Działalności – Polish Classification of Activities) codes of activity given as their main or first PKD code (in the absence of the definition of the main activity) was a code specific for innovative enterprises. These were PKD codes related to activity with software and its derivatives (Section J of PKD) as well as scientific research and development works in various fields (Section M of PKD). It is necessary to consider the functioning of virtual offices, places that allow one to register activities at a given address without actually working there.

The following institutional anchors and business support entities were selected: business incubators (including Academic Business Incubators), technology transfer centres and science/ technology/ science and technology parks. Fablabs and coworking offices were also included as additional business environment entities. The selection of entities and centres was made on the basis of industry reports regarding the location of start-ups and innovation centres in Poland[2].

5. THE METHODOLOGICAL LIMITATIONS OF RESEARCH AND OBJECTIVE BARRIERS TO THE FORMATION OF IDS IN POLAND

The fact that we hardly found any IDs in Poland can be explained either by the limitations of the methodology or by the existing situation. The methodology may have many limitations, but there are objective reasons why it is difficult to group innovative entities.

The obtaining quantitative data at the municipal level is problematic. This is due to, among others, the quality of the censuses held in Poland, where there is no aggregation of data at a level lower than of a *poviat* [county]. There is a major problem in obtaining any socio-economic data for individual cities. Unfortunately, in most Polish cities this data is rarely aggregated for statistical units smaller than the area of a whole city.

In the case of testing the concentration of innovative enterprises, we primarily used point data, which we subjected to spatial analysis. Among the databases which contain data on enterprises we can distinguish, among others, the National

[2] The entities were selected on the basis of reports on the Polish start-up environment and innovation in Poland from 2014–2017.

Court Register (KRS), the Central Register and Information on Economic Activity (CEIDG) and the National Economy Register (REGON). The National Court Register contains information on commercial law companies, while the CEIDG has a registry of the self-employed. We chose the KRS database primarily because self-employed people quite often do not work where they are registered. Moreover, people running a sole proprietorship in ICT often work under the so-called contractual contracts, having *de facto* rights similar to those of full-time employees, and above all they do their work mainly at the headquarters of the company ordering the service. The collection of data for the selected cities was problematic in each database. The data from the National Court Register can be obtained through the MojePaństwo platform, which is significant. Unfortunately, in this case there may be a problem with obtaining data related to the skills needed to download data through the API. In summary, even if data exists, it is not easily accessible.

It should be noted that the enterprises included in each of these databases must be registered. However, it often happens that innovation processes take place even before the official registration of activities. Many innovations happen within informal teams. It is extremely problematic to capture start-ups or other entities that have not yet registered their activities. One example is that of Warsaw's Praga borough, where Google Campus is located – there we are undoubtedly dealing with innovative projects, but still in the planning phase. For this reason, on the map of Warsaw showing clusters of innovative enterprises, the campus area is not distinctive in any way.

Another issue that we encountered was the setting of the border between enterprises in innovative industries and enterprises in creative industries. It is also problematic to decide exactly which innovative enterprises to choose, even within existing databases. The question we faced when deciding which PKD codes to use does not have one easy answer. Although there is a number of definitions of innovation and innovative enterprises, based on them it would be necessary to choose an excessively wide range[3] of codes, while some of the enterprises having these codes as the sole or main activity do not conduct innovative activities in any scope.

In addition, regarding the ICT industry, we focussed on both software and hardware companies, which are usually assigned various PKD codes depending on what they produce. Other challenges are also worth mentioning. Entities of innovative industries can quickly change a product, business model, or their industry. In particular, this applies to start-ups, but not exclusively. For example, it

[3] In many studies, both people associated with innovative and creative work (Florida) are treated as a creative class. As Moretti suggested, there is a need to distinguish between these two groups. They appear in specific areas usually at different times and are often the representatives of gentrifiers in various waves of this process – the arrival of employees and companies from creative industries often precedes the arrival of those from innovative industries.

was difficult for us to indicate a model software house, as entities of this type often try to create their own products, even based on ideas that will arise during the implementation of commissioned work. It is problematic to label companies as start-ups. This is often how mature companies describe themselves. Concentrating on ICT services, it is worth noting that computer scientists, software engineers and software developers are quite commonly distinguished. These are completely different activities, with different levels of required competences and other innovation potential. In Poland, however, such typology is not highly visible.

Although it is possible to pre-determine certain clusters of innovative enterprises in selected cities together with the entities in their environment, without knowledge of a city, its context, or specific areas of potential innovation districts it is impossible to state unequivocally whether and what type of innovation district we are dealing with. For this reason, it is necessary to extend spatial analysis to include field studies, including ethnographic analyses.

Our field studies are based on observations and IDIs. The criteria to be met by the model innovation district were adopted from the Project for Public Spaces. The eight main criteria of innovation districts, according to Nate Storring and Meg Walker (2016), are: identity, diversity, continuity, sociability, proximity, mobility, flexibility, and unity. Based on these criteria, we made observations and opinions about specific places that we visited as part of ethnographic research, and also during the interviews we referred to the categories listed in Tables 1 and 2.

6. THREE TYPES OF SPATIAL CONCENTRATION, BASED ON THE EXAMPLE OF CRACOW

Cracow is a city with many innovative industry entities. There are a bottom-up (NOID) and top-down (PID) groupings of entities. Zabłocie is a place commonly recognised by the residents as a NOID. But does a scientific analysis confirm this? In other words, one should ask whether from the perspective of spatial analysis Zabłocie is characterised by a significantly higher density of innovative entities than other areas in the city and whether there are no other, more important clusters. Here, however, we encountered a number of difficulties with identifying innovation districts both in Cracow and across the country.

6.1. Area 1. Zabłocie

The first example of a concentration of innovative companies is Zabłocie. This area of Cracow is part of the Podgórze district, which delimited from the north and the west by the Vistula River, to the east by the Cracow Zabłocie – Cracow

Bonarka railway line, and to the south by a voivodeship road. While in our research we focused on its western part (delimited by Klimeckiego Street to the north-east and the railway line to the south-west), due to the spatial aspect and its interesting historical background, we will also discuss its spatial scope slightly more broadly. The entire Zabłocie area can be divided into two basic parts: eastern and western. The eastern part consists mainly of family allotments and a small service area with the adjacent port. The western part is a dynamically developing cultural, service and housing space along with a private university located in the north.

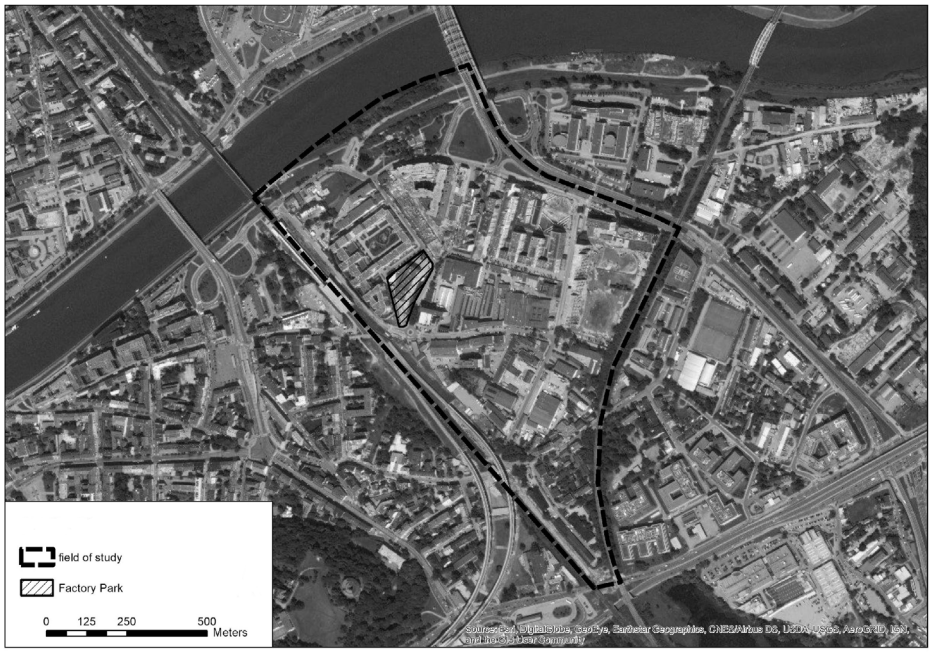

Fig. 1. Zabłocie NOID

Source: own work based on Esri, Digital Globe.

The history of Zabłocie begins around the mid-14th century. Both its history and location in the immediate vicinity of the Vistula were of key importance in the subsequent development of both the spatial and economic district. Before the First Partition of Poland, the riverside part of Zabłocie served as a salt port. In the 18th century an important trade route and in the second half of the 19th century the main Galicia railway line ran there. Then, quite a significant development of Zabłocie as an industrial district took place. Until nearly the end of the 20th century, there were several factories and industrial plants, including the famous Schindler's Factory. The political changes of the late-1980s forced extensive changes,

causing a rather painful collapse of companies, mainly state-owned, located in the Zabłocie area (Wiśniewski, 2011).

A revival, in economic, tourist and housing terms, occurred at the beginning of the 21st century. A number of investments – mainly transport – such as the construction of Kotlarski Bridge and the Father Bernatka foot and bicycle bridge connecting Kazimierz with Podgórze contributed to this. The creation of a large, private academic centre has also had a significant impact on the development of Zabłocie. In 2006, the City Council of Cracow also adopted a resolution establishing the Program for the Revitalisation and Activation of the Post-industrial Zabłocie Area, and Zabłocie itself was entered as a strategic area for the city[4].

A spatial development analysis is an indispensable element of research conducted on the development of a city, but also on innovation districts, both bottom-up and top-down. It is a kind of a "wide window on the physical structure of cities" (Oliveira, 2018, p. 124). The local spatial development plan in the area of our research is referred to as "AREA B – Old Zabłocie". The basic purposes of this area are quite diverse; however, it mainly consists service buildings with a predominance of commercial services. The northern part is primarily of medium intensity multi-family housing where there is the possibility of accommodating services, and areas of housing and services[5]. In the central part of the examined area there is also a section intended for service areas with a predominance of public services.

Zabłocie is an interesting case in terms of morphology: its development and expansion are practically exclusively internal, and it is difficult to observe any manifestations of urban sprawl of the Zabłocie area into neighbouring areas; more often changes in the streets or in the development of individual plots or their quarters can be noticed. This is primarily due to the physical boundaries of the Vistula River, the embankment, and the railway line.

The main transport artery of the analysed part of Zabłocie is Klimeckiego Street, which is part of the 2nd Cracow bypass. The examined area seems to be one of the better locations in terms of transport accessibility: a rich network of bus and tram connections as well as the immediate vicinity of the Cracow-Zabłocie railway station offering connections at the regional level are an important advantage of this location. However, there are no typical parking spaces other than those belonging to residential buildings or owned by existing companies, so many cars are parked on the sidewalks. The northern part of Zabłocie is the aforementioned

[4] The adopted Strategy for the Development of Cracow has set, within sectoral programs, priority tasks and key investment projects for the city's development. Among them there was the construction of the Zabłocie-Krzemionki junction, which is one of the metropolitan tasks, and the revitalisation of the Zabłocie area – as a form of economic activation of the city. The former aims to connect Cracow with Silesia by means of a high-speed railway. The latter works first and foremost towards the revitalisation of degraded areas, which has largely succeeded.

[5] Usually referred to services located on the ground floors of buildings.

multi-family housing, which is characterised in part by a closed spatial structure – there are no typical fences encircling individual or groups of buildings: here a building itself acts as a fortress defending a common space created in the form of a courtyard in the shape of old tenements. Services located on the ground floor are open to both residents and visitors or employees of nearby companies. The second, slightly newer, housing estate, already has typical fences and consists of a complex of several multi-family buildings.

The focal point of the analysed area is the quarter closely related to the cultural aspect and history of the place, as it is home to Oskar Schindler's Enamel Factory, the Mocak Museum of Contemporary Art, and the Glass and Ceramics Centre. To the east of this quarter, in Przemysłowa Street, there is one of the office buildings belonging to Factory Park, a complex of buildings with office space for rent. It mainly brings together companies from the ICT and advertising industries. The office building itself is an example of typical industrial architecture from the 1950s with a recently renovated facade, and its pole structure enables extensive changes in the spatial arrangement inside the building itself.

The western and eastern parts of the study area are marked by the aforementioned railway tracks separating old Zabłocie from Podgórze from the west.

Table 1. Zabłocie as an innovation district

Zabłocie			
Criteria of innovation districts	**meets**	**partly meets**	**does not meet**
visibility of innovation		x	
variety of functions		x	
mobility	x		
social functions of space	x		
continuity / insulation		x	
flexibility and variability		x	
multisensorism	x		

Source: own work.

The analysed part of Zabłocie is distinguished by a very good transport accessibility and a relatively high variety of functions. A strong mix of many forms of spatial development naturally enables the creation of interpersonal interactions, often spontaneous. Diversified, interesting, industrial architecture enables various types of modifications and interference in the development of this area. Also, a multitude of public spaces in the form of, among others, neighbouring cafes and small restaurants enhances the impression of spatial innovation.

6.2. Area 2. Cracow Technology Park (KPT)

Another area serving entities of the innovative industry is the Cracow Technology Park [Krakowski Park Technologiczny] along with an existing complex of service buildings. It is located in the Dębniki district. It is delimited from the north by Podole Street and from the south by Bobrzyńskiego Street and it is located in the vicinity of office buildings of such companies as Shell, Motorola, and Nokia.

Fig. 2. KPT PID

Source: own work based on Esri, Digital Globe.

In the case of the KPT and the neighbouring areas, it is difficult to indicate any place history important for the development of this type of industry. It is a relatively newly developed area, mainly due to the fact that the KPT itself, for example, has had its headquarters here only since 2015[6]. Most companies located in this area have used either free or relatively expensive land or ready-made buildings and space for rent, which could significantly contribute to their density in this area.

The primary purpose of this area in the local spatial development plan is the location of higher education teaching and research facilities. In addition, the permissible

[6] Previously the headquarters were part of the Czyżyny district.

designation makes it possible to build technology centres, business incubators or various types of services, as well as bicycle paths and pedestrian routes. Commercial services areas have been designated slightly more to the southwest where it is possible to establish, among others, office or catering buildings. The area opposite the KPT, in accordance with the current plan and current state, is intended for open areas: with agricultural use and low-growing greenery, with a categorical prohibition on erecting buildings.

To the north of the study area, there are extensive undeveloped green areas mentioned in the context of the local plan. The morphology of space currently slightly limits pedestrian movement. Perhaps this is due to the seemingly endless process of creating space around the park, or maybe it is the result of planned – or just the opposite, unplanned and underestimated – actions. There is also little space here that is conducive to accidental interactions between employees of different companies. The only major communication artery located near the KPT and at the same time leading to it is Podole Street, which additionally generates periodic traffic jams, mainly due to the residents commuting from there and the residential area located to the west. Rows of cars park on both sides of the street in parking spaces designated by the administrator. Transport accessibility is better because the complex is in close proximity to one of the main streets in this part of the city, Bobrzyńskiego Street. Also, in the immediate vicinity there are a tram terminus, a bus station and the Czerwone Maki Park and Ride, with bicycle racks and 200 parking spaces for cars.

Table 2. KPT as an innovation district

KPT			
Criteria of innovation districts	**meets**	**partly meets**	**does not meet**
visibility of innovation	x		
variety of functions		x	
mobility		x	
social functions of space		x	
continuity / insulation	x		
flexibility and variability			x
multisensorism			x

Source: own work.

Considering the presented criteria which should be met by the innovation district, it can be seen that the area of KPT meets them only partially. This is influenced by, among others, slightly more difficult transport options due to the peripheral location or not very pro-social and pro-promotional development of the space

around the park, which is not conducive to people-to-people contacts. Also, there is only minimal availability of catering outlets or lower-order services. The flexibility and variability of space is practically imperceptible: it is the park administrator who determines the location of individual components and equipment and users must adapt to this. The area where the aforementioned office buildings are located is relatively better in this respect, where the space seems to be friendlier and better thought out, developed with employees in mind.

It is worth making some general observations here. Our analysis showed that there are several IDs in Poland, but definitely fewer than we expected. Companies are not only dispersed on a city scale, but also on a national scale. It was only when we went out into the field that we could determine whether an area was an ID. Observations and interviews have suggested that the grouping of innovative enterprises in Poland is limited by three barriers, the first being the generally low spatial mobility of Poles. The employees of innovative industries have relatively better financial conditions, but moving to another city can still be a challenge for them. Additionally, the incentive is rarely strong enough to move between the centres we surveyed. Another barrier is the general acceptance of the activity of real estate developers. even though there are fewer gated estates being built in Poland than a few years back, land purchase for housing investments in possible innovation districts reduces their potential. The third barrier is the lack of availability of premises with adequate space in places properly connected to growing start-ups. For example, many of the entities that took part in the study were located in tenement houses, and each expansion of the company was a challenge. It was necessary to purchase and connect two residential premises, or move to another district, away from the current homes of some of the staff. The spaces themselves are often adapted: companies try to function in spaces which were not designed for office work (suboptimal room arrangement, problems with soundproofing or street access, etc.). All of these barriers can be seen in the example of Cracow. The actions of developers follow the example of Zabłocie. The residential function is dominated by the innovative function, and the low, post-industrial buildings housing the seats of start-ups and other innovative entities are visually dominated by growing blocks of flats and apartment buildings. The area itself is delimited by residential buildings, a river, a campus and a railway embankment, which prevent the district from expanding. At the same time, the very effort of the innovation sector entities to function in close proximity clearly indicates that they define frequent interactions between potential competitors as something beneficial.

6.3. Area 3. 'Totemic' spaces

When considering the innovative environment from a socio-anthropological perspective, a certain paradox can be observed: on the one hand, innovative companies embody the individualist market success of their founders; but on the other,

and not only in the sphere of declarations, they are based on the egalitarian nature of the community.

As proven by various studies (Ko, 2017), as well as our own, an important element of the culture of innovation are references to community ideas, including: open access and exchange of information, and sharing resources and space. These references are not only mythical (not only part of the industry lore), but they are a real and significant element of the living world.

Currently, however, it is the network that is becoming an important 'component' of real spaces. It enables the connection of local communities and geographically distant groups. It might seem that with the emergence of the ICT technologies the importance of physical space has fallen into the background (Löw, 2016, p. 27). However, only hybrid space provides an individual with the opportunity to meet within a group of people with similar interests. Web 2.0 media play a special role in this world. Through them, not only fan and consumer communities are born, but also communities of innovative entrepreneurs. The French sociologist Michell Maffesoli (1995) referred to such communities as new tribes. The members of such a community not only participate in a shared social world, but also decide about the degree of involvement in its creation.

Thus, to complement the image of the reality of innovative companies in the ICT industry, we decided to supplement the PID and NOID model with a third element of the presence of innovation in the city, which can be called – referring to Maffesoli (1995) – totemic spaces. We define totemic spaces, after Maffesoli, as those places and totems that connect an individual with a long series of ancestors (Maffesoli, 1995, p. 136). It is not about the mystical identification known from classical anthropology, but certain, contemporary forms of ex-stasis (going beyond oneself), forms of behaviour related to the group experiencing their identity, as part of meetings of people interested in innovation.

The bond established between members of such a community is based on emotional involvement and on the spiritual basis they share. A bond occurs when there is a transition from individual passion to sharing it with others of one's own kind – socialisation. Neo-tribes are not so much based on the detachment of an individual from everyday problems of the world as on a strong sense of common identity. Within neo-tribal communities, every person determined by their own territory, their own tribe, their own ideology can, though, simultaneously, in a very short time, enters another territory, into another tribe, into a different ideology (Maffesoli 1995, p. 215). To build the image of these totemic spaces, we prepared an analysis of the events related to the innovation industry, which covered the period from 5 January 2017 to 10 August 2018.

The data came from the website crossweb.pl, which collects information on events related to the broadly defined ICT and innovation industry. Based on the data collected in this period, we prepared a map of events concentrated in Cracow. Altogether there were 954 instances, including mostly meetups (725

events), next workshops (108 events), and conferences (77 events). It is interesting that the events we mapped were not only associated with central locations, but some tokk place in Zabłocie, among others. Thus, for the ICT community, places with not necessarily a central location counted, but rather the connection to specific environment, including clubs, spaces, including those of an industrial nature.

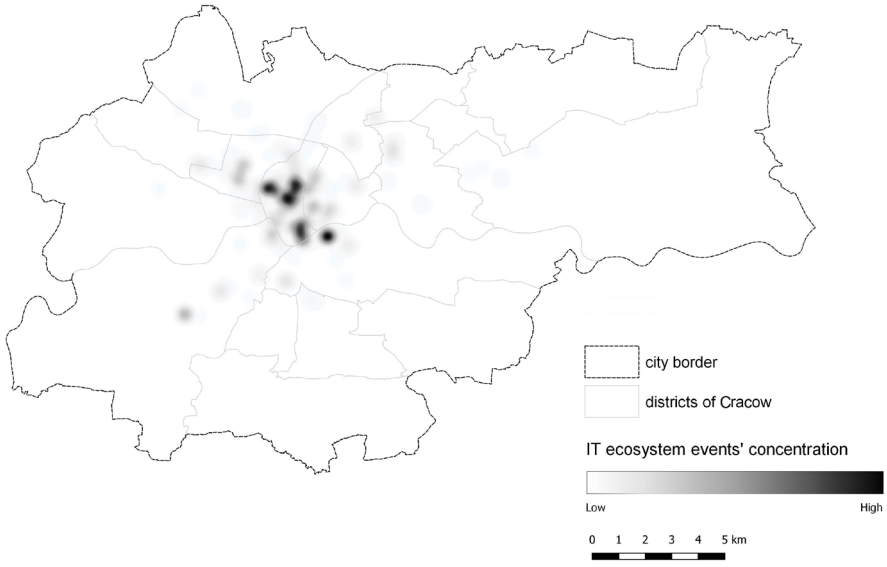

Fig. 3. Totemic spaces
Source: own work.

Maffesoli defined the situation of this type of assembly as polytheism – the gathering of people around many totemic objects (Maffesoli, 1995). However, this community is bound by specific affiliation rituals reminding it that this is 'one body'. Thus, individuals different from each other at different levels produce and share certain common values and meanings. Tribes are also based on the principle of reciprocity, as described by Marcel Mauss (2001). In a sense, such rituals form the bonds of the community, but also teach its members specific behaviours. They also have an additional function, complementing the space of innovation districts, allowing, even if only for a limited time, the concentration of people associated with the innovative community, and thus overcoming the barriers imposed by closed environments of science and technology parks or poorly developed spaces in emerging grassroots innovation districts.

7. CONCLUSION

When undertaking the research into innovation districts in Poland, a number of problems both methodological in nature (e.g. database restrictions and data quality) and conceptual (problems with defining innovative industries and classifying various professions, the dynamics of enterprises themselves) should be considered. This overlaps with the fact that innovation districts are beginning to function as a buzzword. The term is eagerly picked up by various actors who give it various meanings. In some cases, the term 'innovation district' is used interchangeably with such terms as a 'smart city'. Instead of rigorously keeping to the original concept or treating everything that is defined as innovation districts, we try to keep a minimalist working definition according to which an innovation district is a spatial grouping of innovative industry entities in a limited area with an innovative environment. If a rigorous understanding of 'innovation districts' was applied, then not even one such place could be identified in Poland. At the same time, we would be deprived of a conceptual tool that would allow us to capture certain processes. Similarly, it would be useless to use the colloquial understanding of 'innovation districts', that is, to treat every space that could be considered an innovation district. This would lead to unjustified comparisons, and from the perspective of social science, technology parks and districts such as Zabłocie are considered as completely different spaces. This would lead to unjustified comparisons, and from the perspective of social sciences technology parks and districts such as Zabłocie are considered completely different spaces.

For now, our research indicates that innovation districts are not a research artefact. Innovative entities in Poland strive to concentrate in the sense of a trend, but also respondents themselves often express such intentions, treating spatial proximity to other companies as beneficial.

The conceptualisations competing with innovation districts do not seem much more useful, mainly because they focus on the level of interaction on a regional scale, and cities and smaller units remain closed black boxes for them. The fact of opening these and examining what forms of spatial organisation and what interactions actually increase inventiveness seems crucial not only from a scientific but also a practical perspective. The innovation district is another 'invention' which, like the science and technology park before it, is trying to enter Poland without considering the local cultural specificity and understanding the mechanisms of its functioning. It is not enough to draw a quadrant on the map and name it properly for it to start attracting talent and entities that will revive the economy. Surveys of geographical economics impose caution on the value of spatial proximity. It is not the only form of closeness, and incidental encounters with people will not make them start to communicate, trust and cooperate with each other. Our observations on totemic spaces show that the lack of spatial proximity can be compensated for.

To think about one urban model that would be optimal for different cities, industries or economies can also be a trap. Science and technology parks can be socialised, and innovation districts can develop by creating space for various regular events. Generating innovations also requires combining local tacit knowledge with that kind of knowledge that better tolerates movement from place to place. Unfortunately, most of the processes that determine innovation and invention seem to occur as part of micro interactions, and in this case standard geography tools must be supplemented with anthropological analyses.

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